

Science 10

Data Booklet



name: _____

block: _____

ALPHABETICAL LISTING OF THE ELEMENTS

| Element | Symbol | Atomic Number | Element | Symbol | Atomic Number |
|--------------|--------|---------------|---------------|--------|---------------|
| Actinium | Ac | 89 | Mendelevium | Md | 101 |
| Aluminium | Al | 13 | Mercury | Hg | 80 |
| Americium | Am | 95 | Molybdenum | Mo | 42 |
| Antimony | Sb | 51 | Neodymium | Nd | 60 |
| Argon | Ar | 18 | Neon | Ne | 10 |
| Arsenic | As | 33 | Neptunium | Np | 93 |
| Astatine | At | 85 | Nickel | Ni | 28 |
| Barium | Ba | 56 | Niobium | Nb | 41 |
| Berkelium | Bk | 97 | Nitrogen | N | 7 |
| Beryllium | Be | 4 | Nobelium | No | 102 |
| Bismuth | Bi | 83 | Osmium | Os | 76 |
| Bohrium | Bh | 107 | Oxygen | O | 8 |
| Boron | B | 5 | Palladium | Pd | 46 |
| Bromine | Br | 35 | Phosphorus | P | 15 |
| Cadmium | Cd | 48 | Platinum | Pt | 78 |
| Calcium | Ca | 20 | Plutonium | Pu | 94 |
| Californium | Cf | 98 | Polonium | Po | 84 |
| Carbon | C | 6 | Potassium | K | 19 |
| Cerium | Ce | 58 | Praseodymium | Pr | 59 |
| Cesium | Cs | 55 | Promethium | Pm | 61 |
| Chlorine | Cl | 17 | Protactinium | Pa | 91 |
| Chromium | Cr | 24 | Radium | Ra | 88 |
| Cobalt | Co | 27 | Radon | Rn | 86 |
| Copper | Cu | 29 | Rhenium | Re | 75 |
| Curium | Cm | 96 | Rhodium | Rh | 45 |
| Darmstadtium | Ds | 110 | Roentgenium | Rg | 111 |
| Dubnium | Db | 105 | Rubidium | Rb | 37 |
| Dysprosium | Dy | 66 | Ruthenium | Ru | 44 |
| Einsteinium | Es | 99 | Rutherfordium | Rf | 104 |
| Erbium | Er | 68 | Samarium | Sm | 62 |
| Europium | Eu | 63 | Scandium | Sc | 21 |
| Fermium | Fm | 100 | Seaborgium | Sg | 106 |
| Fluorine | F | 9 | Selenium | Se | 34 |
| Francium | Fr | 87 | Silicon | Si | 14 |
| Gadolinium | Gd | 64 | Silver | Ag | 47 |
| Gallium | Ga | 31 | Sodium | Na | 11 |
| Germanium | Ge | 32 | Strontium | Sr | 38 |
| Gold | Au | 79 | Sulfur | S | 16 |
| Hafnium | Hf | 72 | Tantalum | Ta | 73 |
| Hassium | Hs | 108 | Technetium | Tc | 43 |
| Helium | He | 2 | Tellurium | Te | 52 |
| Holmium | Ho | 67 | Terbium | Tb | 65 |
| Hydrogen | H | 1 | Thallium | Tl | 81 |
| Indium | In | 49 | Thorium | Th | 90 |
| Iodine | I | 53 | Thulium | Tm | 69 |
| Iridium | Ir | 77 | Tin | Sn | 50 |
| Iron | Fe | 26 | Titanium | Ti | 22 |
| Krypton | Kr | 36 | Tungsten | W | 74 |
| Lanthanum | La | 57 | Uranium | U | 92 |
| Lawrencium | Lr | 103 | Vanadium | V | 23 |
| Lead | Pb | 82 | Xenon | Xe | 54 |
| Lithium | Li | 3 | Ytterbium | Yb | 70 |
| Lutetium | Lu | 71 | Yttrium | Y | 39 |
| Magnesium | Mg | 12 | Zinc | Zn | 30 |
| Manganese | Mn | 25 | Zirconium | Zr100 | 40 |
| Meitnerium | Mt | 109 | | | |

PERIODIC TABLE OF THE ELEMENTS

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------|-----------|---------------|---------------|------------|------------|-----------|---------|--------------|-------------|----------|-----------|-------------|-------------|------------|-------------|------------|---------------|----|----|----|---------------|--------|----|----|----|--|------|----------|----------|----------|--|-------------|------|------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|
| METALS ← → NON-METALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="margin: auto;"> <tr> <td>Atomic Number</td> <td>22</td> <td>4+</td> <td>3+</td> <td>Ion charge(s)</td> </tr> <tr> <td>Symbol</td> <td>Ti</td> <td>Ti</td> <td>Ti</td> <td></td> </tr> <tr> <td>Name</td> <td>Titanium</td> <td>Titanium</td> <td>Titanium</td> <td></td> </tr> <tr> <td>Atomic Mass</td> <td>47.9</td> <td>47.9</td> <td>47.9</td> <td></td> </tr> </table> | | | | | | | | | | | | | | | | | | Atomic Number | 22 | 4+ | 3+ | Ion charge(s) | Symbol | Ti | Ti | Ti | | Name | Titanium | Titanium | Titanium | | Atomic Mass | 47.9 | 47.9 | 47.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Atomic Number | 22 | 4+ | 3+ | Ion charge(s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | Ti | Ti | Ti | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name | Titanium | Titanium | Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Atomic Mass | 47.9 | 47.9 | 47.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="margin: auto;"> <tr> <td>1</td> <td colspan="16"></td> <td>18</td> </tr> <tr> <td>+</td> <td colspan="16"></td> <td>-</td> </tr> <tr> <td>H</td> <td colspan="16"></td> <td>H</td> </tr> <tr> <td>Hydrogen</td> <td colspan="16"></td> <td>Hydrogen</td> </tr> <tr> <td>1.0</td> <td colspan="16"></td> <td>1.0</td> </tr> </table> | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 18 | + | | | | | | | | | | | | | | | | | - | H | | | | | | | | | | | | | | | | | H | Hydrogen | | | | | | | | | | | | | | | | | Hydrogen | 1.0 | | | | | | | | | | | | | | | | | 1.0 |
| 1 | | | | | | | | | | | | | | | | | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | | | | | | | | | | | | | | | | | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | | | | | | | | | | | | | | | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen | | | | | | | | | | | | | | | | | Hydrogen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.0 | | | | | | | | | | | | | | | | | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9+ | 10+ | 11+ | 12+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Li | Be | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | B | C | N | O | F | He | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lithium | Beryllium | Scandium | Titanium | Vanadium | Chromium | Manganese | Iron | Cobalt | Nickel | Copper | Zinc | Boron | Carbon | Nitrogen | Oxygen | Fluorine | Helium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.9 | 9.0 | 45.0 | 47.9 | 50.9 | 52.0 | 54.9 | 55.8 | 58.9 | 58.7 | 63.5 | 65.4 | 10.8 | 12.0 | 14.0 | 16.0 | 19.0 | 4.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | 19 | 20 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 2+ | 2+ | 2+ | 3+ | 4+ | 4+ | 4+ | 4+ | 4+ | 4+ | 4+ | 3+ | 3+ | 3+ | 2- | 2- | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Na | Mg | K | Ca | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Al | Si | P | S | Cl | Ar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sodium | Magnesium | Potassium | Calcium | Vanadium | Chromium | Manganese | Iron | Cobalt | Nickel | Copper | Zinc | Aluminum | Silicon | Phosphorus | Sulfur | Chlorine | Argon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23.0 | 24.3 | 39.1 | 40.1 | 50.9 | 52.0 | 54.9 | 55.8 | 58.9 | 58.7 | 63.5 | 65.4 | 27.0 | 28.1 | 31.0 | 32.1 | 35.5 | 39.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 2+ | 2+ | 2+ | 3+ | 3+ | 3+ | 3+ | 3+ | 3+ | 3+ | 2+ | 2+ | 2+ | 2+ | 2- | 2- | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rubidium | Strontium | Yttrium | Zirconium | Niobium | Molybdenum | Technetium | Ruthenium | Rhodium | Palladium | Silver | Cadmium | Indium | Tin | Antimony | Tellurium | Iodine | Xenon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85.5 | 87.6 | 88.9 | 91.2 | 92.9 | 95.9 | 101.1 | 106.4 | 107.9 | 107.9 | 107.9 | 112.4 | 114.8 | 118.7 | 121.8 | 127.6 | 126.9 | 131.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | 56 | 57 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 2+ | 3+ | 4+ | 5+ | 6+ | 4+ | 4+ | 4+ | 4+ | 3+ | 2+ | 1+ | 1+ | 2+ | 2+ | 2+ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cesium | Barium | Lanthanum | Hafnium | Tantalum | Tungsten | Rhenium | Osmium | Iridium | Platinum | Gold | Mercury | Thallium | Lead | Bismuth | Polonium | Astatine | Radon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 132.9 | 137.3 | 138.9 | 178.5 | 180.9 | 183.8 | 186.2 | 190.2 | 192.2 | 195.1 | 197.0 | 200.6 | 204.4 | 207.2 | 209.0 | (209) | (210) | (222) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87 | 88 | 89 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9+ | 10+ | 11+ | 12+ | 13+ | 14+ | 15+ | 16+ | 17+ | 18+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fr | Ra | Ac | Rf | Db | Sg | Bh | Hs | Mt | Ds | Rg | Uub | Uut | Uuq | Uup | Uuh | Uus | Uuo | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Francium | Radium | Actinium | Rutherfordium | Dubnium | Seaborgium | Bohrium | Hassium | Mitnium | Darmstadtium | Roentgenium | Ununbium | Ununtrium | Ununquadium | Ununpentium | Ununhexium | Ununseptium | Ununoctium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (223) | (226) | (227) | (261) | (262) | (263) | (262) | (265) | (266) | (281) | (272) | (285) | (284) | (289) | (288) | (292) | (294) | (294) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alkali Metals Alkaline Earth Metals Halogens Noble Gases | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Based on mass of C-12 at 12.00.

Any value in parentheses is the mass of the most stable or best known isotope for elements which do not occur naturally.

NAMES, FORMULAE AND CHARGES OF SOME POLYATOMIC IONS

| Positive Ions | Negative Ions |
|--------------------------|--|
| NH_4^+ Ammonium | CH_3COO^- Acetate |
| | CO_3^{2-} Carbonate |
| | ClO_3^- Chlorate |
| | ClO_2^- Chlorite |
| | CrO_4^{2-} Chromate |
| | CN^- Cyanide |
| | $\text{Cr}_2\text{O}_7^{2-}$ Dichromate |
| | HCO_3^- Hydrogen carbonate, bicarbonate |
| | HSO_4^- Hydrogen sulfate, bisulfate |
| | HS^- Hydrogen sulfide, bisulfide |
| | HSO_3^- Hydrogen sulfite, bisulfite |
| | OH^- Hydroxide |
| | ClO^- Hypochlorite |
| | NO_3^- Nitrate |
| | NO_2^- Nitrite |
| | ClO_4^- Perchlorate |
| | MnO_4^- Permanganate |
| | PO_4^{3-} Phosphate |
| | PO_3^{3-} Phosphite |
| | SO_4^{2-} Sulfate |
| | SO_3^{2-} Sulfite |

NAMES AND FORMULAE OF COMMON ACIDS

| | |
|-------------------|--------------------------|
| Hydrochloric acid | HCl |
| Sulfuric acid | H_2SO_4 |
| Nitric acid | HNO_3 |
| Acetic acid | HCH_3COO |

PREFIXES

| | |
|----|-------|
| 1 | mono |
| 2 | di |
| 3 | tri |
| 4 | tetra |
| 5 | penta |
| 6 | hexa |
| 7 | hepta |
| 8 | octa |
| 9 | nona |
| 10 | deca |

NAMES, FORMULAE, AND CHARGES OF SOME COMMON IONS


* *Aqueous solutions are readily oxidized by air.*

** *Not stable in aqueous solutions.*

| Positive Ions (Cations) | | | |
|------------------------------------|------------------------|--------------------|--------------------------|
| Al^{3+} | Aluminum | Pb^{4+} | Lead(IV), plumbic |
| NH_4^+ | Ammonium | Li^+ | Lithium |
| Ba^{2+} | Barium | Mg^{2+} | Magnesium |
| Ca^{2+} | Calcium | Mn^{2+} | Manganese(II), manganous |
| Cr^{2+} | Chromium(II), chromous | Mn^{4+} | Manganese(IV) |
| Cr^{3+} | Chromium(III), chromic | Hg_2^{2+} | Mercury(I)*, mercurous |
| Cu^+ | Copper(I)*, cuprous | Hg^{2+} | Mercury(II), mercuric |
| Cu^{2+} | Copper(II), cupric | K^+ | Potassium |
| H^+ | Hydrogen | Ag^+ | Silver |
| H_3O^+ | Hydronium | Na^+ | Sodium |
| Fe^{2+} | Iron(II)*, ferrous | Sn^{2+} | Tin(II)*, stannous |
| Fe^{3+} | Iron(III), ferric | Sn^{4+} | Tin(IV), stannic |
| Pb^{2+} | Lead(II), plumbous | Zn^{2+} | Zinc |

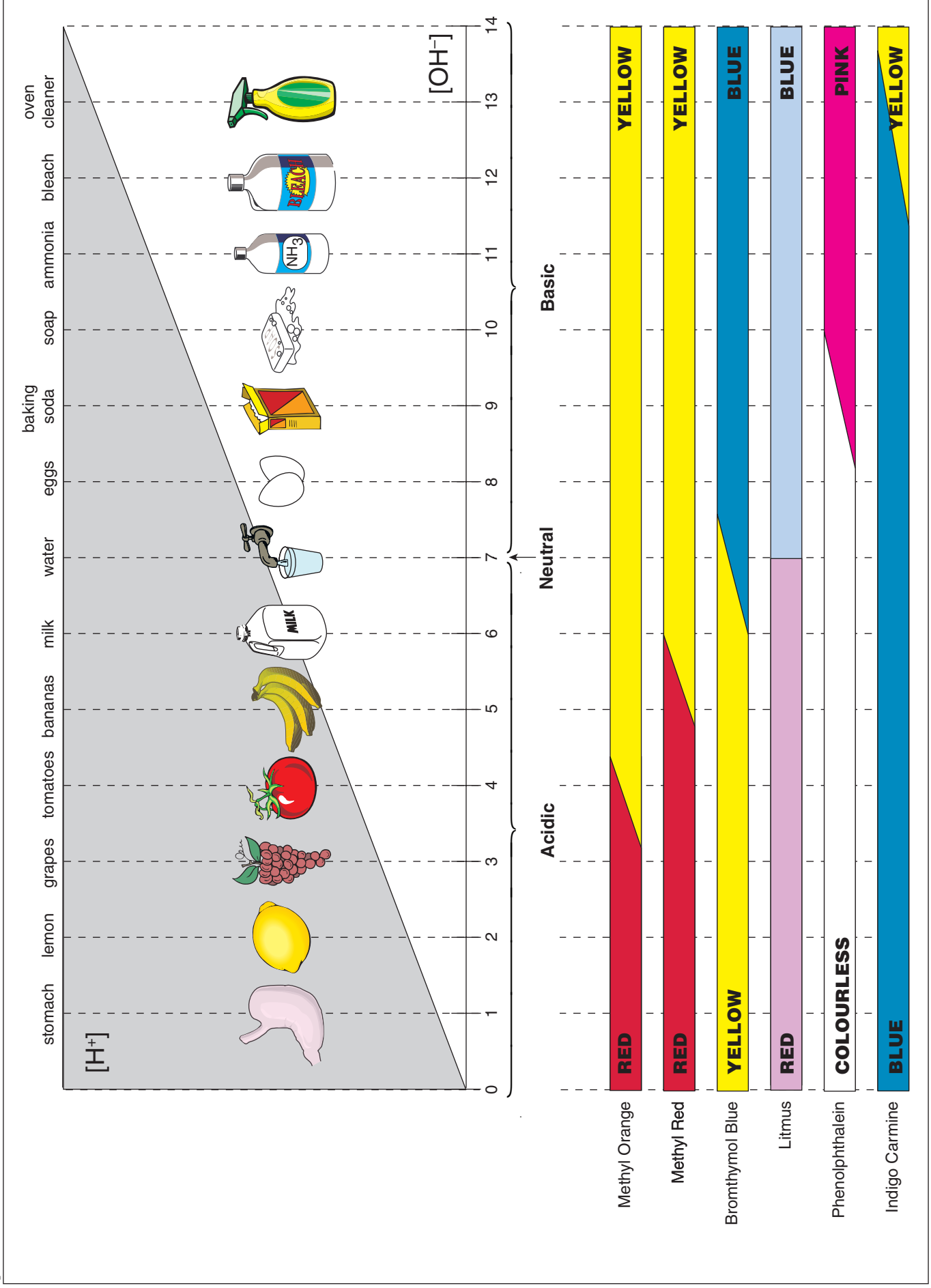
| Negative Ions (Anions) | | | |
|-----------------------------------|---------------------------------|-----------------------------|------------------------|
| Br^- | Bromide | OH^- | Hydroxide |
| CO_3^{2-} | Carbonate | ClO^- | Hypochlorite |
| ClO_3^- | Chlorate | I^- | Iodide |
| Cl^- | Chloride | HPO_4^{2-} | Monohydrogen phosphate |
| ClO_2^- | Chlorite | NO_3^- | Nitrate |
| CrO_4^{2-} | Chromate | NO_2^- | Nitrite |
| CN^- | Cyanide | $\text{C}_2\text{O}_4^{2-}$ | Oxalate |
| $\text{Cr}_2\text{O}_7^{2-}$ | Dichromate | O^{2-} | Oxide** |
| H_2PO_4^- | Dihydrogen phosphate | ClO_4^- | Perchlorate |
| CH_3COO^- | Ethanoate, acetate | MnO_4^- | Permanganate |
| F^- | Fluoride | PO_4^{3-} | Phosphate |
| HCO_3^- | Hydrogen carbonate, bicarbonate | SO_4^{2-} | Sulphate |
| HC_2O_4^- | Hydrogen oxalate, binoxalate | S^{2-} | Sulphide |
| HSO_4^- | Hydrogen sulphate, bisulphate | SO_3^{2-} | Sulphite |
| HS^- | Hydrogen sulphide, bisulphide | SCN^- | Thiocyanate |
| HSO_3^- | Hydrogen sulphite, bisulphite | | |

Table 4.2.2 *Series of Chemical Reactivity*

| Two Activity Series | | |
|----------------------------|--|----------|
| Metals | Decreasing Activity | Halogens |
| lithium |  | flourine |
| potassium | | chlorine |
| calcium | | bromine |
| sodium | | iodine |
| magnesium | | |
| aluminum | | |
| zinc | | |
| chromium | | |
| iron | | |
| nickel | | |
| tin | | |
| lead | | |
| HYDROGEN* | | |
| copper | | |
| mercury | | |
| silver | | |
| platinum | | |
| gold | | |

* Hydrogen may be displaced from most acids by all metals above it in the series. However, it may only be displaced from water (at room temperature) by those above magnesium.

pH SCALE



COMMON ISOTOPE PAIRS CHART

| Isotope | | Half-life of Parent (years) |
|---------------|-----------------|--------------------------------|
| <i>Parent</i> | <i>Daughter</i> | |
| Carbon-14 | Nitrogen-14 | 5730 |
| Uranium-235 | Lead-207 | 710 million |
| Potassium-40 | Argon-40 | 1.3 billion |
| Uranium-238 | Lead-206 | 4.5 billion |
| Thorium-235 | Lead-208 | 14 billion |
| Rubidium-87 | Strontium-87 | 47 billion |

RADIOACTIVITY SYMBOLS

| | | |
|---------------------------------|------------------------------|----------------|
| ${}^4_2\alpha, {}^4_2\text{He}$ | ${}^0_{-1}\beta, {}^0_{-1}e$ | ${}^0_0\gamma$ |
| 1_0n | ${}^1_1p, {}^1_1\text{H}$ | |

UNITS AND ABBREVIATIONS

| Quantity | Unit | Symbol |
|--------------|--------|--------|
| distance (d) | metre | m |
| time (t) | second | s |
| | minute | min |
| | hour | h |
| | year | a |

EQUATIONS OF MOTION

| | | |
|--------------------------------------|---------------------------------|------------------------|
| $v_{av} = \frac{\Delta d}{\Delta t}$ | $a = \frac{\Delta v}{\Delta t}$ | $\Delta v = v_f - v_i$ |
| $\Delta d = v_{av} \Delta t$ | $\Delta v = a \Delta t$ | $v_i = v_f - \Delta v$ |
| $\Delta t = \frac{\Delta d}{v_{av}}$ | $\Delta t = \frac{\Delta v}{a}$ | $v_f = v_i + \Delta v$ |